Critical Review of Mobile Emissions from EPA 2011 NEI: Part Two – Regional VMT/VPOP Activities

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MARAMA MOVES Workgroup conference call,
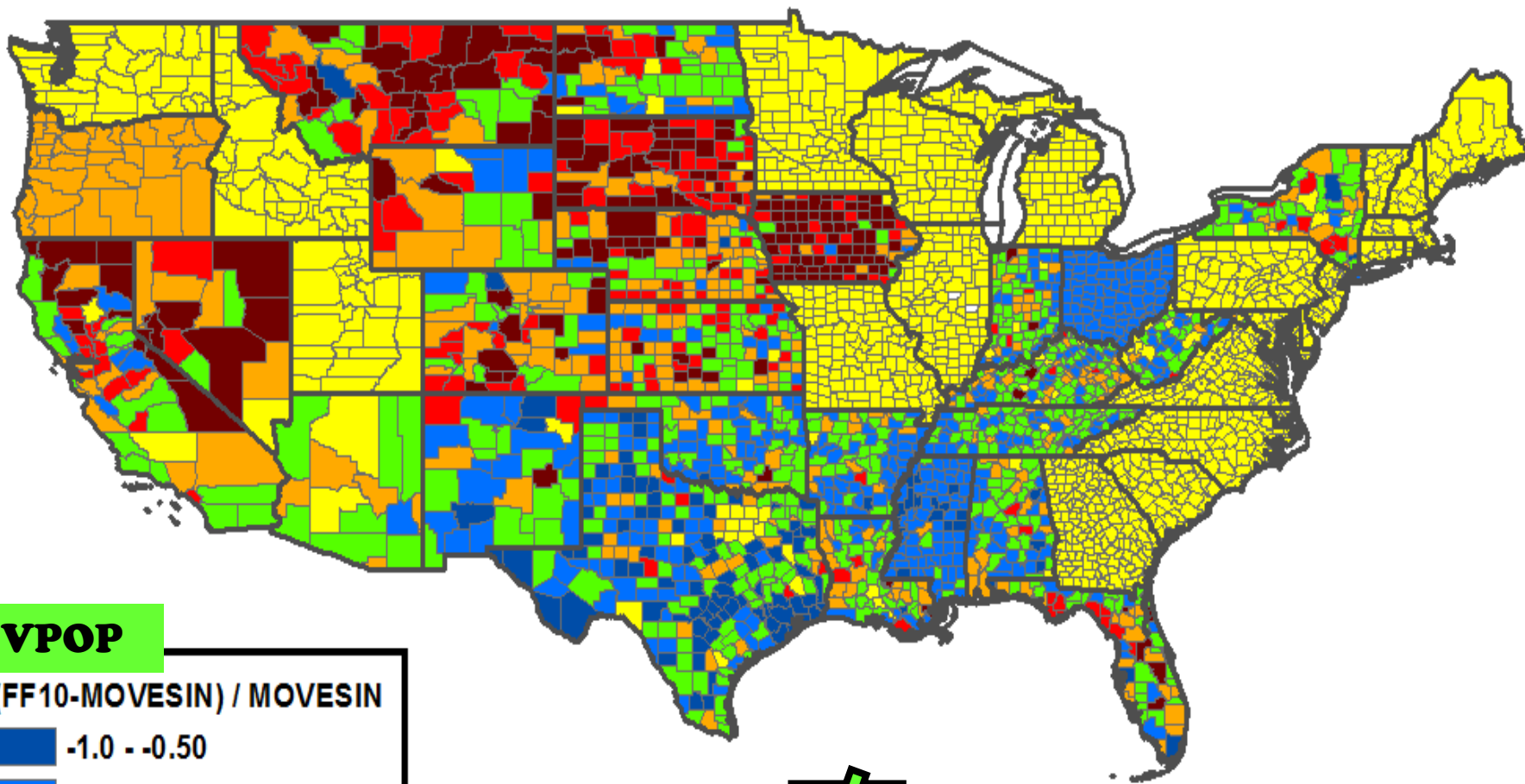January 27, 2014

1

MOVES Activities

- **States provided MOVES activity data (VMT, VPOP) via EIS as part of 2011NEI submittal**

- **MOVES County Database tables (CDBs) containing activity data (in MySQL format) for all counties in the US (>3200) were made available by EPA**

- **SMOKE requires VMT/VPOP by SCC at individual county resolution as model input (i.e., FF10)**

- **County-wide FF10 were made available in 2011NEI modeling platform**
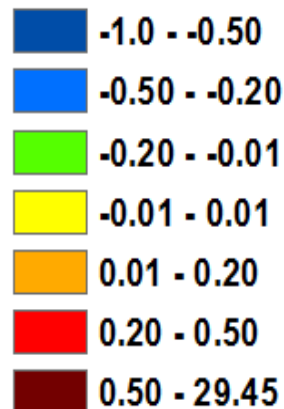
MOVESIN = inputs to MOVES
FF10   = inputs to SMOKE

% = (FF10 – MOVESIN) / MOVESIN

Violation of Conservation Principle in EPA's 2011 NEI -- VPOP

VPOP

(FF10-MOVESIN) / MOVESIN

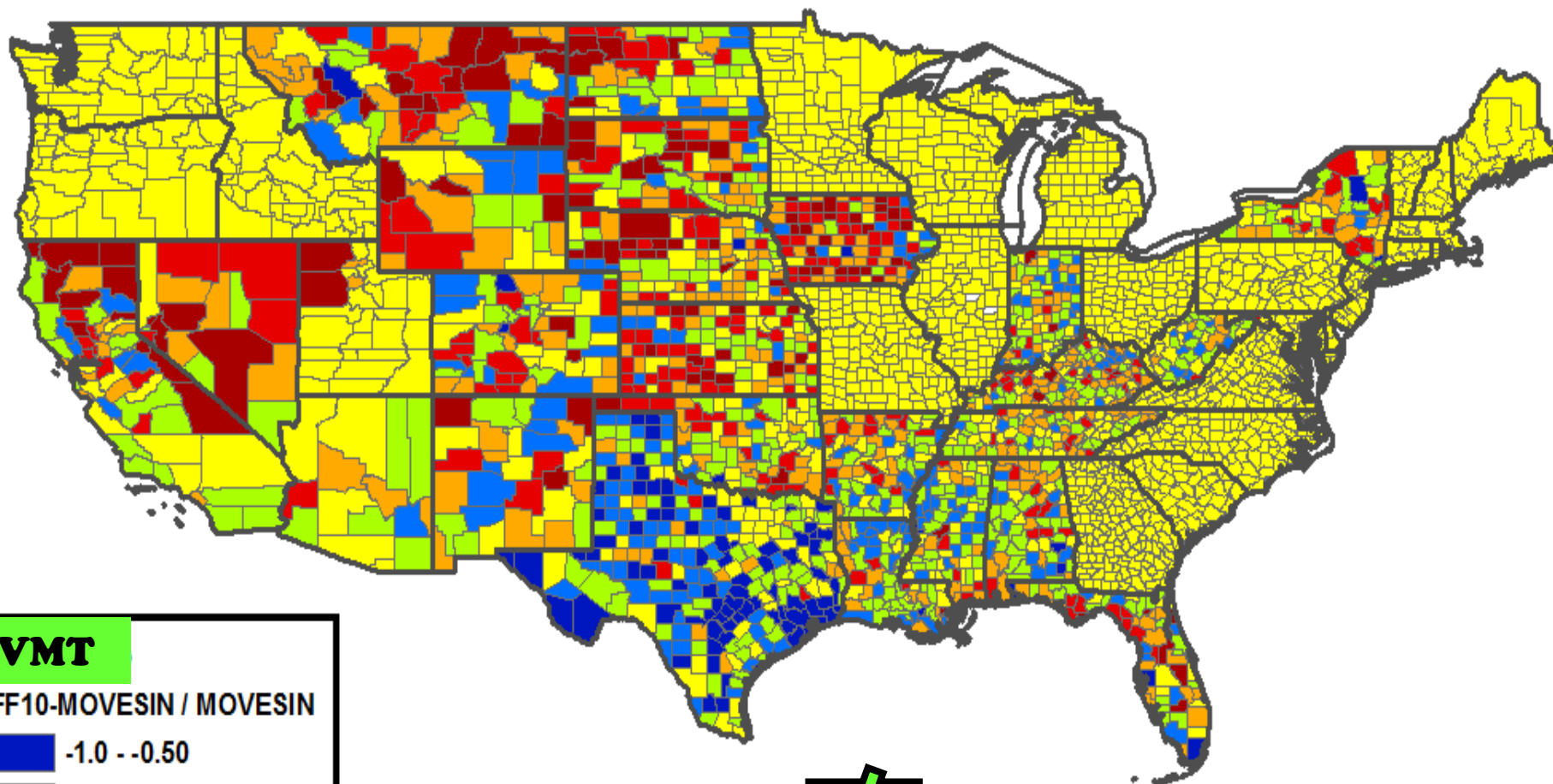|	
▮	-1.0 - -0.50
▮	-0.50 - -0.20
▮	-0.20 - -0.01
▮	-0.01 - 0.01
▮	0.01 - 0.20
▮	0.20 - 0.50
▮	0.50 - 29.45

MOVES inputs ≠ SMOKE inputs

Differences range from -100% to +2900%!
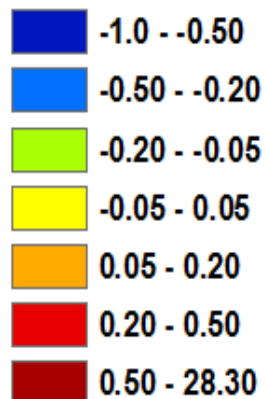
**Vehicle loss in east/south (SMOKE < MOVES);
Vehicle gain in west/north (SMOKE > MOVES)**

3

Violation of Conservation Principle in EPA's 2011NEI -- VMT

VMT

FF10-MOVESIN / MOVESIN

- ■ -1.0 - -0.50
- ■ -0.50 - -0.20
- ■ -0.20 - -0.05
- ■ -0.05 - 0.05
- ■ 0.05 - 0.20
- ■ 0.20 - 0.50
- ■ 0.50 - 28.30

MOVES inputs ≠ SMOKE inputs

Differences range from -100% to +2800%!
Yellow (-0.05 – 0.05) should not be viewed as exact agreement. Every county has either a VMT loss or a VMT gain

4

Discussion on Activities

- **164 CDBs used for nation-wide representative counties were identical to those submitted to EIS in individual county, indicating no VPOP/VMT aggregation in 2011NEI MOVES runs**

- **The practice of no aggregation is contradictory to MOVES2010 Technical Guidance (Section 3.3.1 and Section 3.5.1):**

    "If the lookup table results will be applied to a large number of counties, use the total source type population for all the counties covered. "

    "If the lookup table results will be applied to a large number of counties, use the total VMT for all the counties covered. "

- **Due to input requirements, a methodology allocating VMT/VPOP to SCC must be adopted in order to prepare SMOKE inputs**

Discussion on Activities (cont.)

- The allocation of VMT and VPOP by SCC is important in emission estimates:

  ex. 1000 VMT for HDDV $\neq$ 1000 VMT for LDGV

- For states that did not provide data:

  -- What was the source for the activity data?

  -- How were VMT and VPOP by SCC developed?

- For states that did provide data:

  -- Differences in VPOP should be near zero (slight loss is due to CNG vehicles)

  -- How were VMT and VPOP by SCC developed?

- VMT and VPOP, while considered "dummy" in the representative county lookup table approach, have an effect on emission rates. The magnitude of this impact is unknown.

- Activity data must be conserved throughout the process

Problems with EPA 2011 NEI

- Activities were not aggregated

- Unknown methods for allocating activities by SCCs

- Many states provided no data

- Activities are not conserved

Recommendations

- Implement the new SCC algorithm at once -- in 2011NEI version2 and in MOVES2014. This should eliminate the need for activity allocations and eradicate conservation problem

- It is more effective if EPA reaches out to "missing" states to obtain local state-specific data, rather than try to develop new defaults in lieu of missing data (improvements from improved defaults are likely minimal)

- Until full impact is assessed and quantified, activities should be aggregated over group counties to comply with MOVES guidance

- Phase out representative county approach